# Royal Institution of Chartered Surveyors
# Roots 2009, Cambridge England, 23rd and 24th$^{th}$ March 2009

# Developing a rural land investment performance index for New Zealand

Professor Chris Eves
School of Urban Development
Queensland University of Technology
Brisbane, Australia
Ph: 61 7 31389112
email: **chris.eves@qut.edu.au**

**Key Words**

Rural land, farmland values, rural land total returns, capital returns

**Abstract**

Agricultural production is one of the major industries in New Zealand and accounts for over 60% of all export trade. The farming industry comprises 70,000 entities ranging in size from small individual run farms to large corporate operations.

The reliance of the New Zealand economy to the international rural sector has seen considerable volatility in the rural land markets over the past four decades, with significant shifts in rural land prices based on location, land use and underlying international rural commodity prices.

With the increasing attention being paid to the rural sector, especially in relation to food production and bio-fuels, there has been an increasing corporate interest in rural land ownership in relatively low subsidised agricultural producing countries such as New Zealand and Australia.

A factor that has limited this participation of institutional investors previously has been a lack of reliable and up-to-date investment performance data for this asset class.

This paper is the initial starting phase in the development of a New Zealand South Island rural land investment performance index and covers the period 1990-2007.

The research in this paper analyses all rural sales transactions in the South Island and develops a capital return index for rural property based on major rural property land use. Additional work on this index will cover both total return performance and geographic location.

**INTRODUCTION**

Despite the overall size of the rural property market and the continued importance of agricultural land to the New Zealand and Australian economies, rural property markets in these countries have received minimal attention by property researchers in comparison to the extensive research attention given to Australian commercial and residential property markets (e.g.: Newell, 1996; Newell and Higgins, 1996; Newell and MacFarlane, 1996; Newell, 1998). In recent years, only Eves (1998, 2004, and 2005, 2007) has critically investigated the investment performance of Australian rural property, however this investigation has been limited to New South Wales. Studies by Eves and Painter (2007, 2008) and Eves and Natea (2008) have addressed the investment return from New Zealand rural property, but this has been based on an overall composite rural property market and has not addressed investment performance this from a specific land use or geographic location basis.

Similar rural property research trends are also evident in the USA, with only Kaplan (1985), Lins et al (1992), Rubens and Webb (1995) and Eves and Newell (2000, 2007, 2008) investigating the performance of US farmland in an investment context. The analysis of the

UK rural land market, from an investment performance perspective is also limited, with studies by Eves and Newell (2006) and the RICS currently providing data on rural land prices with the RICS Farmland Prices Index, however this index base date is only 1995.

The main reasons for this lack of critical research into New Zealand, Australian and international rural property are:

(i) The declining significance of the rural sector, in comparison to the emergence of the resources and services sectors (USDA, 1999; ABARE, 1998).

(ii) The low level of institutional ownership of agricultural property. In Australia this is currently only 0.8% of the total institutional property portfolio. This compares with institutional exposure to the office (45%), retail (42%), industrial (8%) and hotel/leisure (2%) property sectors (Property Council of New Zealand, Property Council of Australia, 1998).

(iii) The lack of reliable investment performance indices for rural property. Only one rural property index ise currently available for Australia that provides a total return investment performance series.. There are several rural land capital value indices available in the US. The NCREIF US farmland performance index (NCREIF, 1998) is the only internationally available valuation based corporate rural property performance series in the major developed countries. The United States Department of Agriculture also compiles an annual rural land index based on sales transactions, as do several US land based Universities such as Texas A&M University and Iowa State University. These indices are state based and account for limited areas of agricultural production. In the UK IPD provide a timberland index and RICS have commenced a farmland index, which is transaction based. In comparison, institutional-standard office, retail and industrial property performance indices are readily available for USA, UK, Canada, South Africa, Australia and New Zealand (Property Council of Australia, Property Council of new Zealand, 2007).

Reliable property investment performance indices are essential for informed investment decision-making by institutional investors. The lack of such an investment performance index for rural property in New Zealand has been one of the major impediments to the critical examination of the investment performance of New Zealand rural property by potential investors, including institutional investors. This problem in New Zealand and Australia is

similar to most countries, with the exception of the US where the availability of the USDA index and the NCREIF index has encouraged a greater degree of institutional ownership of rural property.

## RESEARCH PURPOSES AND OBJECTIVES

The development of the New Zealand South Island rural investment performance index will be carried out over three phases, starting with the initial work on capital return performance..

With the development and on-going updates of this NZ South Island Rural Land Investment Performance Index, it will be possible to:

- Rigorously and objectively assess the capital and total return investment performance of NZ rural property.
- Compare the performance of rural land on both a regional location basis and on a land use basis
- Compare New Zealand, Australian, US, UK and Canadian rural land investment performance from 1990.

## RESEARCH METHODOLOGY

### Rural land sales database: 1990-2007

This NZ rural property investment performance index and regional sub-indices have been constructed from data provided by the commercially available Headway ValBiz sales transaction computer database. The Headway Systems ValBiz program is a commercial computer database of all sales transactions and land title transfers that occur throughout New Zealand, with all sales recorded on a Local Government District basis, as well as actual land use type. The computer database information is provided from completed notices of transfer which have to be provided to the respective LGDs and Land Titles Office whenever land is transferred, sold or resumed. This computer database allows sales and transfers to be sorted on a land use basis, area, price and date of unconditional contract.

The data base has allowed the sales transaction data to be divided into 24 districts and six specific rural land use categories (this study will cover 5 of these categories, with the sixth being more related to rural/residential).

For the period 1990-2007, 100,634 rural property sales in South Island NZ are available for analysis, of which approximately 42,000 can be considered to be sales of viable rural properties. The integrity and quality of the ValBiz database compares favorably with the equivalent US, Australian and Canadian farmland sale transaction databases.

**Rural property database: quality control/audit**

Although the initial database contained just over 100,000 sales transactions for rural property in the study area of NZ, these sales included transactions that cannot be classified as full economic farming units. Additional sorts had to be undertaken to ensure that non-economic farm enterprises were not included in the analysis. However, these sales have been isolated to provide details for the rural residential capital return performance index.

Three computer and manual sorts have been conducted to audit and improve the integrity and data quality of the RP Data database information; namely:

- Rural sales within and between government departments have been removed.
- "Same name" property transfers were examined, and eliminated if the price per hectare was significantly below the average price per hectare for that particular period.
- All family sales, no value sales and transfers initiated by the Family Law Court were excluded.
- All sales with a land area of less than 2 hectares were also excluded from the rural analysis but included in the rural/residential database

All of the above quality control audits ensure the continued integrity and reliability of this rural property database.

**Rural property investment capital return performance indices: 1990-2007**

Table 1 shows the break-up of sales transaction data for each of the land use types following the filtering and sorting of the base data. Based on these 42,033 rural property sales from 24 LGDs over the period 1990-2007, a rural property capital return investment performance index for NZ South Island has been developed. Using $ per hectare as the benchmarking investment performance criteria and December 1990 benchmarked to an index value of 100, an annual rural property investment performance index structured initially on land use, has been established.

**Table 1: Sales Transaction Summary: 1990-2007**

| | Arable | Dairy | Forestry | Horticulture | Pastoral | Special use |
|---|---|---|---|---|---|---|
| 1990 | 228 | 157 | 2008 | 113 | 1189 | 52 |
| 1991 | 191 | 135 | 1570 | 185 | 2169 | 133 |
| 1992 | 163 | 207 | 1276 | 177 | 1841 | 256 |
| 1993 | 188 | 182 | 177 | 182 | 1859 | 142 |
| 1994 | 139 | 250 | 162 | 176 | 1644 | 179 |
| 1995 | 175 | 255 | 189 | 163 | 1462 | 116 |
| 1996 | 193 | 233 | 164 | 127 | 1299 | 136 |
| 1997 | 115 | 140 | 120 | 129 | 1087 | 70 |
| 1998 | 144 | 147 | 84 | 135 | 1055 | 84 |
| 1999 | 153 | 204 | 121 | 178 | 1505 | 109 |
| 2000 | 194 | 313 | 75 | 200 | 1638 | 116 |
| 2001 | 188 | 335 | 69 | 197 | 1798 | 152 |
| 2002 | 145 | 226 | 82 | 232 | 1301 | 136 |
| 2003 | 128 | 233 | 98 | 159 | 1139 | 159 |
| 2004 | 106 | 219 | 62 | 208 | 1130 | 126 |
| 2005 | 124 | 265 | 83 | 155 | 1065 | 128 |
| 2006 | 94 | 189 | 78 | 153 | 953 | 109 |
| 2007 | 115 | 266 | 59 | 162 | 1225 | 125 |
| Total | 2783 | 3518 | 6521 | 3031 | 25359 | 2328 |

Table 1 shows the annual sales transactions for each rural land use classification, after all sorts and filters have been completed. This table shows the most active rural land use in relation to sales transactions were pastoral (25,359) and forestry (6,521); however, over 70% of these forestry sales occurred in the period 1990-1992. The total sales for arable land, horticultural land and dairying were reasonably similar.

**Land Use**

- Arable land
- Dairy land
- Forestry
- Horticultural

- Pastoral
- Special use

## RESULTS AND DISCUSSION

These research results focus on the analysis of the rural land transaction data for the 24 districts of NZ South Island. This paper focuses on the capital returns for the main rural land uses in these districts.

**Figure 1: Price per hectare: NZ Rural Land Uses: 1990-2007.**

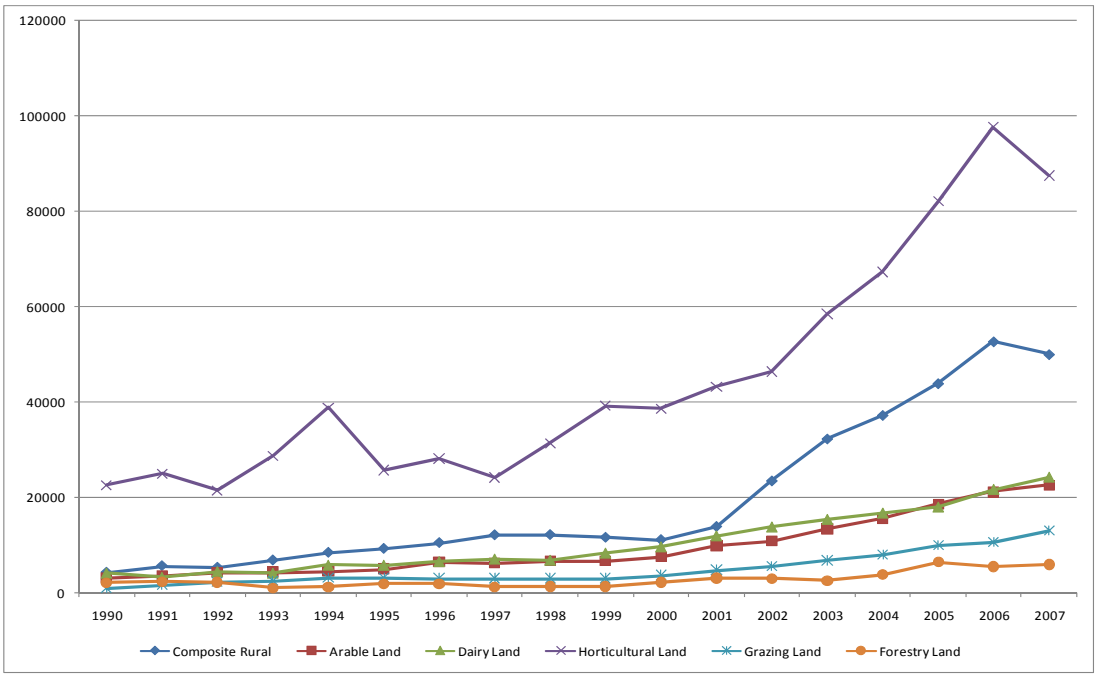



Figure 1 represents the average price per hectare for the main rural land use categories in New Zealand. This figure shows the significant increases in prices for rural land from the period 2000 to 2007, and the impact of horticultural land in relation to the overall rural land market in New Zealand. During the period of the study the average annual price for horticultural land has increased from $22,600 in 1990 to $87,500 per ha in 2007, mainly due to the major shift to wine grape production in NZ. Over the same period pastoral land has shown the largest increase in price from $938 in 1990 to $12,979 in 2007. During the same period the price per hectare for dairy land increased from $4,169 to $24,000.

**Average and Weighted Average Capital Returns**

Table 2 shows both the annual and average annual capital returns for rural land in NZ and the weighted annual and weighted average annual capital returns for NZ rural land based on the sales volume for each of the individual regions.

From this table, it can be seen that on a simple average basis the average annual capital return for NZ rural land has been 17.0%, with volatility of 19.2%. During the period 1990-2007, there have been four years when the capital return for rural land was negative (1992, 1999, 2000 and 2007). However, on a weighted basis there has only been one year when rural land has shown a negative capital return (1997) and the average annual capital return has been lower at 14.7%, with a significantly reduced volatility of 11.5%.

On a weighted basis the highest one year capital return was 1991 (42%) predominately due to the large volume of forestry sales (refer to Table 1), with the lowest positive capital return being in 1996 (2.1%).

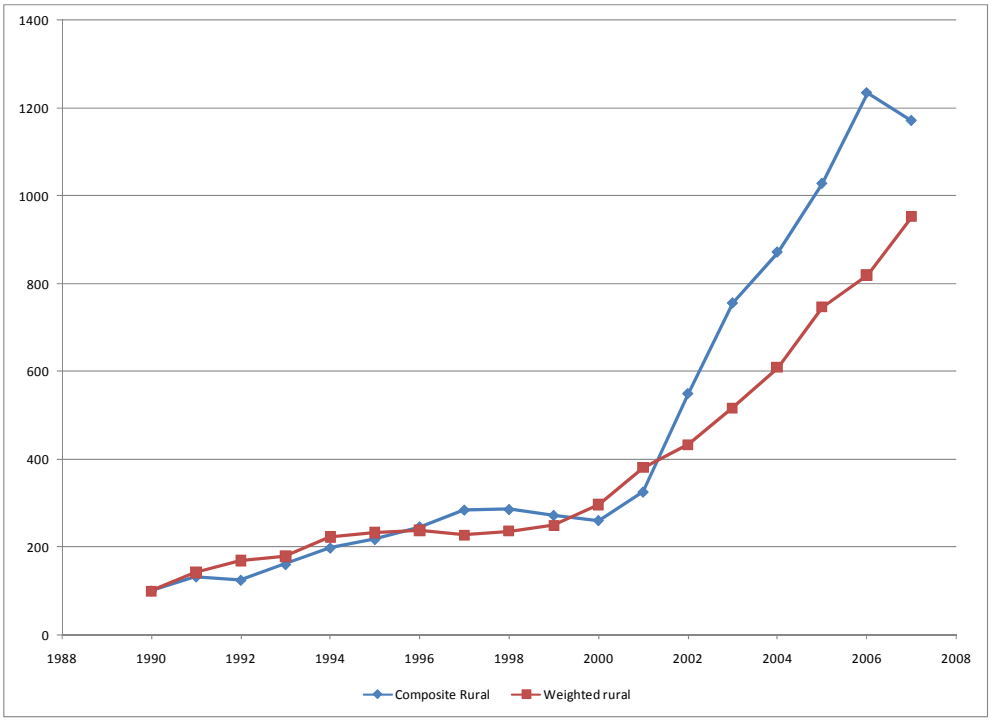
**Table 2: NZ Rural Land Capital Returns: 1990-2007**

| Year | NZ (Average) | NZ (Weighted Average) |
|---|---|---|
| **1991** | 32.3 | 42.1 |
| **1992** | -5.9 | 19.3 |
| **1993** | 28.7 | 5.8 |
| **1994** | 23.5 | 24.6 |
| **1995** | 9.8 | 4.1 |
| **1996** | 13.3 | 2.1 |
| **1997** | 15.5 | -4.2 |
| **1998** | 0.4 | 3.7 |
| **1999** | -4.7 | 5.5 |
| **2000** | -4.3 | 19.2 |
| **2001** | 24.8 | 28.4 |
| **2002** | 69.0 | 13.8 |
| **2003** | 37.6 | 19.2 |
| **2004** | 15.3 | 17.9 |
| **2005** | 17.9 | 22.5 |
| **2006** | 20.1 | 9.8 |
| **2007** | -5.1 | 16.3 |
| **Average Annual Return (%)** | 17.0 | 14.7 |
| **Risk (%)** | 19.2 | 11.5 |

Figure 2 represents the investment performance of NZ rural land on an index basis and also shows the variation in average annual capital returns based on the NZ average and weighted average analysis.

The variation in the capital returns has been greater in the period 2001-2007, compared to the results for the period 1990-2001. The significant increases in the pastoral land price from 1990 to 1992 has been the main cause of the significant difference between the weighted and average annual capital return in the early period of the study.

**Figure 2: NZ Rural Land Capital Return Index: 1990-2007**




This increase in the price of pastoral land (1990-1992) was driven by the increase in land being purchased for forestry plantations. The number of sales for established plantations decreased after the mid 1990's, as did the number of sales transactions for this rural land use from 2,008 sales in 1990 but down to less than 200 per year by 1993.

**New Zealand South Island Rural Land Use Performance**

Table 3 shows the average annual capital returns for the major South island rural land uses for the period 1990-2007. From this table it can be seen that there is considerable variation in the capital return for rural land based on land use. This variation in change in rural land prices from year to year in the five rural land use categories regions can be attributed to prevailing seasonal conditions, major commodity prices and the demand for rural land by alternate property markets such as the rural lifestyle and "Tree Change" markets (Eves, 1998).

An analysis of the average annual capital returns based on the last 12 months, last three, five, ten and 15 years is shown in Table 3 Again, this table shows the significant variation in rural

land capital returns for the land use categories at various time periods since 1990. Pastoral land has shown the highest average annual capital return over the study period, as well as the highest return for the past 12 months, last 5 and last ten years. The returns for arable and dairy land have been relatively consistent over the period of the study. Horticulture was the only rural land use to show a negative return over the period and this was only for the year 2007.

**Table 3: NZ Rural Land Use: Capital Returns: 1990-2007**

| Return % | Last 12 Months | Last 3 Years | Last 5 Years | Last 10 Years | Last 17 Years |
|---|---|---|---|---|---|
| **Arable** | 6.5 | 13.2 | 15.9 | 14.1 | 12.6 |
| **Dairy** | 11.8 | 13.3 | 12.0 | 13.3 | 11.9 |
| **Forestry** | 8.5 | 20.9 | 19.4 | 21.3 | 11.6 |
| **Horticulture** | -10.4 | 10.2 | 14.3 | 14.4 | 10.1 |
| **Pastoral** | 22.1 | 17.6 | 18.7 | 16.3 | 18.0 |
| **NZ Composite** | -5.1 | 11.0 | 17.2 | 17.1 | 17.0 |

However, these average figures do not give an accurate assessment of the volatility of rural property capital returns for rural property in New Zealand. The annual returns for each of the land use sectors are shown in Table 4.

**Table 4: NZ Rural Land Capital Returns: Rural Land Use: 1990-2007**

| | Arable | Dairy | Forestry | Horticulture | Pastoral |
|---|---|---|---|---|---|
| **1991** | 12.21 | -20.63 | 7.01 | 10.70 | 76.76 |
| **1992** | 17.08 | 35.81 | -2.54 | -14.00 | 36.07 |
| **1993** | 4.00 | -7.10 | -53.20 | 33.25 | 10.11 |
| **1994** | 5.73 | 39.90 | 15.84 | 35.45 | 23.59 |
| **1995** | 9.06 | -0.15 | 56.71 | -33.71 | 1.73 |
| **1996** | 29.64 | 12.96 | -2.32 | 9.34 | -4.10 |
| **1997** | -4.28 | 7.82 | -36.99 | -13.92 | -1.00 |
| **1998** | 8.21 | -3.20 | 14.96 | 29.23 | -0.17 |
| **1999** | -1.25 | 21.60 | 1.67 | 25.30 | 1.93 |
| **2000** | 14.54 | 15.60 | 62.72 | -1.46 | 20.95 |
| **2001** | 30.09 | 23.69 | 39.70 | 12.00 | 30.45 |
| **2002** | 9.57 | 15.41 | -3.33 | 7.17 | 16.22 |
| **2003** | 23.95 | 11.55 | -14.03 | 26.01 | 22.07 |
| **2004** | 16.17 | 8.47 | 48.30 | 15.03 | 18.78 |
| **2005** | 19.69 | 7.52 | 69.30 | 22.04 | 22.91 |
| **2006** | 13.33 | 20.49 | -15.04 | 18.99 | 7.85 |
| **2007** | 6.50 | 11.82 | 8.53 | -10.44 | 22.06 |
| **Average %** | 12.60 | 11.86 | 11.61 | 10.06 | 18.01 |
| **Volatility %** | **9.65** | **14.85** | **34.29** | **19.23** | **19.21** |

From this table, it can be seen that the change in price for the various rural land uses has been volatile over the study period, especially for the Forestry land use (34.9%). However, care has

to be taken in relation to this land use category, as the sales transaction data does not specify the age, type or quality of the various forestry transactions and this significant variation in forestry type could be the explanation for the volatility in the price of forest land from one year to the next.

In respect to the five rural land uses, arable land has shown the second highest average annual return of 12.6%, but at the lowest level of risk at only 9.65%. pastoral land has shown the highest average annual capital return at 18.01%, but also the highest volatility (excluding forestry)of all rural land uses in NZ at 19.21%. This could be due to the fact that any trend in relation to the development or increase in the development of horticultural crops, farming crops and dairy farms has been predominately from the pastoral grazing land base.

The volatility of commodity prices and demand for commodities in the horticultural sector of the NZ rural industry is reflected in the relatively low average annual capital return of 10.6% and a significantly higher volatility of 19.23% (higher than both arable land and dairy land). Horticultural land also had 5 years of negative growth; whereas arable had only 3 years where the capital return was negative.

Again the high volatility for forestry land is a function of changes in legislative issues associated with emission trading, variation in plantation type and plantation ages that are not identified in the sales transaction data.

Table 5 shows the volatility of the five rural land uses over the past three, five and ten years. From this table, it can be seen that apart from forestry, the change in rural land prices since 1998 have been less volatile than the period 1990 to 1998. This particularly applies to arable and dairy land that have shown volatility on average annual returns of only 6.6% over the past three years compared to 9.65% and 14% over the full study period. Whereas, forestry has been more volatile over the past three and five years compared to the full study period.

**Table 5: Rural Land Use: Volatility: 1998-2007**

| Risk % | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|
| **Arable** | 6.60 | 6.60 | 9.05 |
| **Dairy** | 6.61 | 5.12 | 7.98 |
| **Forestry** | 43.52 | 37.91 | 31.36 |
| **Horticulture** | 17.94 | 14.42 | 12.82 |
| **Pastoral** | 8.46 | 6.29 | 9.93 |

Figures 3 and 4 compare the capital return investment performance of the five rural land uses on an index basis since 1990. Both figures also include the NZ South Island rural land weighted average index for the same period.

From Figure 3, it can be seen that pastoral grazing has performed better than arable and dairy land over the period 1990-2007, and that grazing land has been the main land use in relation to the composition of the weighted index. Over the period of the study the pastoral land capital return index has risen from the base of 100 to 1384, well above the index values for dairy and arable land in 2007, at 580 and 709 respectively. This figure also shows that the most significant increase in the indices for all land uses has been during the period 1999 to 2007. Prior to 1999, all land uses had shown relatively steady increases in both land prices and capital return performance. Figure 3 also shows that the trend in the performance indices for arable land1990 to 2002 and dairy land has been very similar during the period. However, since 2002 arable land has outperformed dairy land and this can be attributed to the increased demand for farmers converting to dairy farming from 2002 to 2007, with the main land bank for this conversion being arable and grazing properties.

**Figure 3: NZ Rural Land Capital Return Index: Arable/Dairy/Pastoral: 1990-2005**

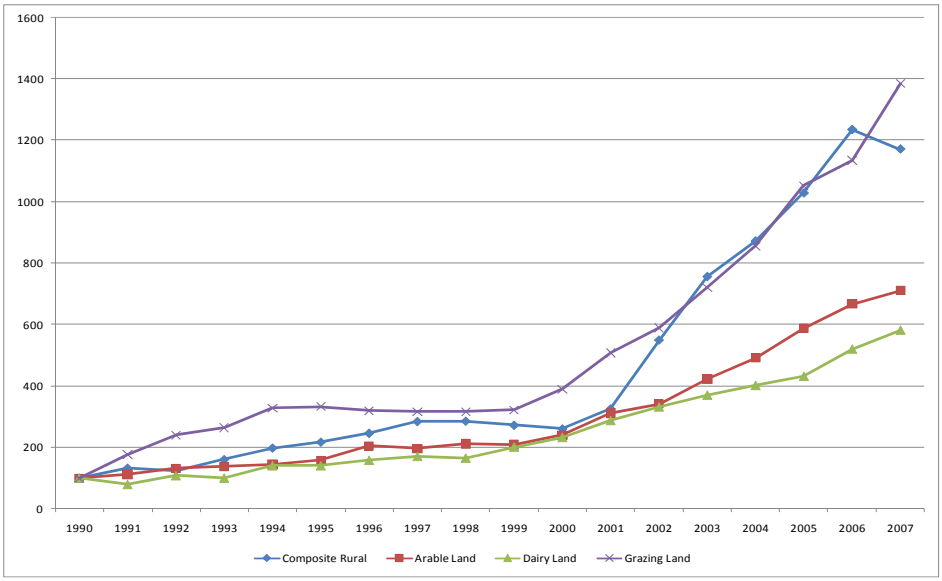
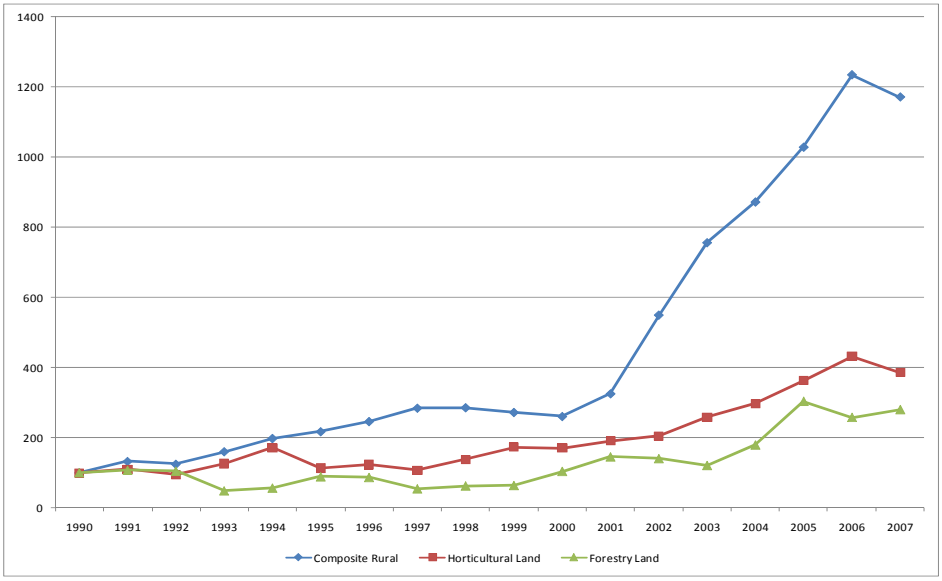



Figure 4 compares the capital return investment performance of Horticulture and Forestry land in South Island NZ to the NZ weighted capital return for the period 1990-2007.

From this figure, it can be seen that rural land in the horticultural areas of NZ has outperformed forestry land. However, both these rural land uses have been well below the NZ

composite index. This figure also shows the significant fall in the value of forestry land from 1992 to 1995 and the subsequent periods of negative growth in this rural property asset class.

**Figure 4: NZ Rural Land Capital Return Index: Horticulture and Forestry: 1990-2005**




**Correlation Analysis**

Table 6 shows the correlation matrix for the five land uses for the period 1990-2007. The interesting aspect of this correlation analysis is that there are no significant positive correlations between the movement in prices for the various rural land uses over the past 17 years. Previous rural property studies in US, Australia and Canada have tended to show significant correlations for similar rural land uses in rural locations/countries (especially in similar geographic locations), but this has not been the case in New Zealand. The highest positive correlations ($r = 0.36$, $r = 0.23$) were arable land and forestry and arable and pastoral land respectively.

Of particular interest in relation to the correlation analysis is the fact that there were some weak negative correlation between some of the rural land use categories. These included:

Dairy and pastoral land ($r = -0.17$)
Horticultural and pastoral land ($r = -0.20$)

**Table 8: Correlation Analysis: Rural Land Use: 1990-2005**

| | Composite Rural | Arable Land | Dairy Land | Horticultural Land | Pastoral Land | Forestry Land |
|---|---|---|---|---|---|---|
| Composite Rural | 1.00 | | | | | |
| Arable Land | 0.14 | 1.00 | | | | |
| Dairy Land | -0.16 | 0.14 | 1.00 | | | |
| Horticultural Land | 0.28 | 0.07 | 0.03 | 1.00 | | |
| Pastoral Land | 0.21 | 0.23 | -0.17 | 0.02 | 1.00 | |
| Forestry Land | -0.26 | 0.36 | 0.06 | -0.20 | 0.15 | 1.00 |

* Significant at the 5% level

## CONCLUSIONS

The rural land markets in New Zealand are very diverse and are driven in a large part by the world supply and demand for agricultural commodities. As a major exporter of rural commodities, New Zealand is more exposed to changes in commodity prices than other agriculture exporting countries.

This study shows that there are considerable differences in the change in rural land prices, not just on an annual basis, but also based on rural land use categories in New Zealand.

Over the past 17 years the average annual return for rural land has ranged from 10.06% for horticultural land to 18.01% for pastoral land, with considerable variation in the volatility of rural land price from year to year.

Although dairy and horticultural production have been the main focus of rural commodity production in New Zealand over the past 5 years, this has not actually been reflected in the capital return performance of these two rural land use sectors. This increase in dairy and horticultural production has been based on the purchase of arable and pastoral land for the base of these increasing rural industries and this has been reflected in the higher prices and capital returns for arable and pastoral land, especially since 2000.

The problem of trends in rural production is also highlighted in this analysis, with the transaction data showing increased sales and activity for rural land use property over the period of the study. This is evidenced by the large number of forestry sales in the early

1990's, when this was considered the promising investment vehicle, with the subsequent decline in this industry in the late 1990's.

Of particular note is the limited correlation between the various land use categories in New Zealand over the study period. This can be explained to some extent by the trend for new Zealand farmers to change rural land use on their farms to take advantage of high rural commodity prices. This is currently being evidenced by the increase in the number of farmers converting their arable and grazing properties to dairy production.

**REFERENCES**


Collins, H. (1958). Movement in rural land values. The Valuer 15:156.

Eves, C and Painter, M (2008). A comparison of US, Canadian, Australian and New Zealand Rural Property. Australian New Zealand Property Journal. Vol 1, No. 7,

Eves, C and Natea G. (2008**).** Diversification Benefits from New Zealand Real Estate. *Pacific Rim PropertyRresearch Journal*. Vol 14, No. 1, pp 27-40.

Eves, C and Painter, M (2008). The financial gains from adding farmland to an international investment portfolio. *Journal of Real Estate Portfolio Management*. Vol 14, No. 1, pp 63-74

Eves, C and Newell, G (2007). The role of US farmland in real estate portfolios. *Journal of Real Estate Portfolio Management*. Vol 13, No. 4, pp 317-327

Eves, C. (2007) An Analysis of NSW Rural Land Performance 1990-2005. 13th Pacific Rim Real Estate Society Conference. Freemantle Perth January 2007

Eves, C. (1997). Analysis of NSW rural land performance: 1985-1995. The Valuer and Land Economist 34(6):551.

Eves, C. (1998). Influence of commodity prices and farm profit on rural land markets and valuation practice. New Zealand Valuers Journal (Sept):30.

Eves, C. (2005) Developing a NSW rural property investment performance index. Australian Property Journal Vol 38, No. 6, pp 427-432.

Kaplan, H. (1985). Farmland as a portfolio investment. Journal of Portfolio Management 12:73.

Lins, D. et al. (1992). Institutional portfolios: diversification through farmland investment. AREUEA Journal 20:549.

MacPhillamy, C. (1972). Rural land prices: current situation and prospects. The Valuer 17:702.

NCREIF. (1998). Farmland index performance report: 2nd quarter 1998. NCREIF: Chicago.

Newell, G. (1996). The inflation-hedging characteristics of Australian commercial property. Journal of Property Finance 7:6.

Newell, G. and Higgins, D. (1996). Impact of leading economic indicators on commercial property performance. The Valuer and Land Economist 34:138.

Newell, G. and MacFarlane, J. (1996). What does property trust performance tell us about commercial property returns? Australian Land Economics Review 2:10.

Newell, G. (1998). The distributional characteristics of Australian commercial property returns. Australian Land Economics Review 4:23.

Property Council of New Zealand. (1998). Investment Performance Index: December 1997. PCNZ: Auckland.

Rubens, J. and Webb, J. (1995). Farmland as an inflation hedge. Real Estate Research Issues 2:129.